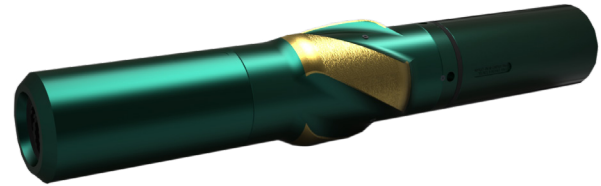


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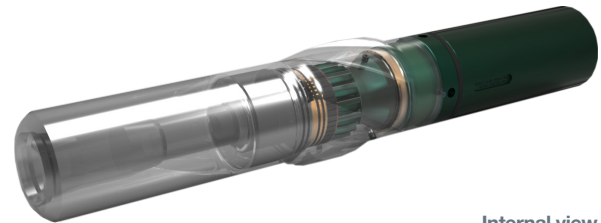
HI TOOL® - Harmonic Isolation Tool

The HI Tool® Harmonic Isolation Tool is an on-bottom drilling tool, designed to reduce vibrational loads generated by drill bit dynamics. Drill string vibrations are typically the most common cause of NPT for the operators and suppliers of complex MWD/LWD equipment. Extensive job history with the HI Tool® has shown results for operators, with a direct impact on reduction of drilling costs in both domestic and international markets.



Features and benefits

- Limits lateral and axial vibration problems in difficult formations, which reduces non-productive time (NPT)
- Reduces the dynamic interaction between the bottom-hole assembly (BHA) and drill bit, through a flexible geared connection
- Decouples the BHA and mud motor harmonics from the drill bit and drill string
- Decouples the BHA from the drill string harmonics in severe drilling applications
- Allows the drill bit to self-center dynamically



Internal view



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HI TOOL™ - Harmonic Isolation Tool

Specifications						
Tool series	HI-2600		HI-1700	HI-1200	HI-800	HI-600
Connection details						
Upper connection (box up)	7-5/8" Reg. LTM	7-5/8" Reg.	7-5/8" Reg.	6-5/8" Reg.	4-1/2" IF	3-1/2" IF
Lower connection (String tool - Pin down)	7-5/8" Reg. LTM	7-5/8" Reg.	7-5/8" Reg.	6-5/8" Reg.	4-1/2" IF	3-1/2" IF
Lower connection (NB tool - Box down)	7-5/8" Reg. LTM	7-5/8" Reg.	7-5/8" Reg.	6-5/8" Reg.	4-1/2" Reg.	3-1/2" Reg.
Max. make-up torque	99,025 ft-lbs	87,140 ft-lbs	87,140 ft-lbs	45,000 ft-lbs	51,981 ft-lbs	13,745 ft-lbs
Tool dimensions						
Fish neck / tong neck O.D.	11-1/4"	9-1/2"	9-1/2"	8-1/2"	7"	5"
Fish neck length	26	26	23"	19"	19"	15"
Tong neck length (G&E)	22" upper body 18" lower body	20" upper body 18" lower body	20" upper body 15" lower body	13" upper body 9.5" lower body	14"	12"
Tool drift I.D. (C)	2.980"	2.980"	2.855"	2.780"	1.475"	1.485"
Overall tool length (A)	85-1/2"	83-1/2"	63"	42-1/2"	47"	39.7"
Approx. tool weight (lbs.)	3,300 - 3,500	3,200 - 3,400	1,250 - 1,420	400 - 550	250 - 350	190 - 250
Connection bending strength ratio	5.02	2.81	2.81	3.62	2.70	2.24
Blade dimensions						
Blade O.D. (B)	19-1/2" - 28"	19-1/2" - 28"	12-1/8" - 17-1/2"	9-3/4" - 14-3/4"	7-3/4" - 8-3/4"	5-7/8" - 6-3/4"
Blade length	32"	32"	21"	12"	11"	9" - 10"
Crown length (D)	8.5"	8.5"	6"	4"	6"	5-1/4"
Blade width (perpendicular to axis)	7.5" - 8.5"	7.5" - 8.5"	6"	3.5"	3.5"	2.4"
Blade wrap	270°	270°	300°	160°-190°	290°-320°	245°-270°
Number of blades	3	3	3	3	3	3
Blade type	Spiral	Spiral	Spiral	Spiral	Spiral	Spiral
Structural mechanical / operational properties						
Rated flow rate	1,750 gpm	1,750 gpm	1,500 gpm	1,250 gpm	850 gpm	500 gpm
Typical pressure drop at rated flow rate (heavily dependent on ppg)	80 psi	80 psi	60 psi	40 psi	70 psi	40 psi
Max. rubber operating temperatures	HNBR 929-05 390°F/200°C					
Torsional limit	110,030 ft-lbs	96,820 ft-lbs	96,820 ft-lbs	45,600 ft-lbs	35,629 ft-lbs	15,270 ft-lbs
Max. weight on bit	150,000 lbs	100,000 lbs	100,000 lbs	100,000 lbs	100,000 lbs	40,000 lbs
Tensile limit	1,500,000 lbs	1,400,000 lbs	1,400,000 lbs	900,000 lbs	390,000 lbs	420,000 lbs
Burst pressure	5,000 psi	4,800 psi	4,800 psi	4,400 psi	6,000 psi	5,000 psi